



Correlation between autism severity and functional mobility in children with autism spectrum disorder

Meghna Mangesh Pendurkar^{1*}, Dr. Pranjal Grover²

¹ TMV's Lokmanya Tilak College of Physiotherapy, Kharghar, Navi Mumbai, Maharashtra, India

² Principal and Professor, TMV's Lokmanya Tilak College of Physiotherapy, Kharghar, Navi Mumbai, Maharashtra, India

Corresponding Author: Meghna M Pendurkar

DOI: <https://doi.org/10.66856/ijmhr.2026.12.4.12097>

Abstract

Background: Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by difficulties in social communication and interaction and restricted and repetitive patterns of behaviour. Alongside these core characteristics, children with ASD may present with motor and functional difficulties involving coordination, balance and postural control. These difficulties may influence mobility, independence and participation in everyday activities.

Objective: To determine the correlation between autism severity and functional mobility in children with autism spectrum disorder.

Methods: A cross-sectional correlational study was conducted among 25 children with clinically diagnosed ASD aged 5-12 years. Participants were independently ambulatory and able to follow simple instructions. Autism severity was assessed using the Indian Scale for Assessment of Autism (ISAA), while functional mobility was assessed using the Timed Up and Go (TUG) test. Descriptive statistics and the Shapiro-Wilk test were used for analysis. As ISAA scores were not normally distributed, Spearman's rank correlation coefficient was used to determine the relationship between ISAA score and TUG completion time.

Results: The mean age of participants was 7.48 ± 2.24 years. Mean ISAA score was 131.00 ± 33.00 and mean TUG completion time was 39.30 ± 14.90 seconds. A positive strong correlation was observed between ISAA score and TUG completion time 131.00 ± 33.00 and mean TUG completion time was 39.30 ± 14.90 seconds.

Conclusion: Greater autism severity was associated with poorer functional mobility in the studied sample. The findings support consideration of functional mobility as an important component of physiotherapy assessment in children with ASD.

Keywords: Autism spectrum disorder, functional mobility, autism severity, Indian Scale for Assessment of Autism, Timed Up and Go, children, physiotherapy

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by persistent difficulties in social communication and interaction together with restricted and repetitive patterns of behaviour. In clinical practice, children with ASD may also demonstrate difficulties related to motor performance, coordination, balance, postural control and movement planning.

Motor and functional difficulties are relevant because mobility is closely linked with a child's ability to participate in daily activities. Difficulties in movement may influence independence, play, school-related activities and participation in the community. From a rehabilitation perspective, understanding the functional consequences associated with ASD is therefore important for identifying areas that may require assessment and intervention.

Functional mobility refers to the ability to move effectively during activities such as changing position, walking and during movement transitions. The Timed Up and Go (TUG) test is one such measure. It requires the participant to rise from a chair, walk, turn, return and sit down, thereby incorporating transitional movement, walking and turning within a single task.

Autism severity can be quantified using standardized assessment tools. The Indian Scale for Assessment of Autism (ISAA) was developed for assessment of autism-

related characteristics and provides a quantitative measure across domains including social relationship, emotional responsiveness, speech-language communication, behaviour patterns, sensory aspects and cognitive components in the Indian population.

Previous studies have investigated motor and balance differences in children with ASD and have also examined the reliability of the TUG in this population. These studies provide support for considering motor performance and functional mobility during assessment of children with ASD. Studies have also supported the use of ISAA for assessment of autism severity.

The present study was undertaken to examine the correlation between autism severity and functional mobility in children with ASD. Autism severity was assessed using the ISAA and functional mobility was assessed using the TUG test. The study aimed to determine whether higher autism severity scores were associated with longer TUG completion times.

Methods

Study Design

The study used a cross-sectional correlational design. This design was selected to examine the relationship between autism severity and functional mobility at a single point in time.

Study Setting

Participants were recruited from Divyang Special School, Navi Mumbai, and Little Krishna Child Rehabilitation Centre, Ulwe.

Participants and Sampling

The study included 25 children with a clinical diagnosis of ASD. Participants were between 5 and 12 years of age. Participants were recruited using convenience sampling. The final sample consisted of children who fulfilled the predetermined eligibility criteria and completed the necessary assessments.

Inclusion Criteria

- Clinical diagnosis of ASD based on DSM-5 criteria.
- Age between 5 and 12 years.
- Independent ambulation without an assistive device.
- Ability to follow simple instructions.
- Written informed consent provided by a parent or guardian.

Exclusion Criteria

- Recent injury or surgery.
- Uncontrolled epilepsy.
- Visual or hearing impairment.
- Use of a walking aid or orthosis.
- Severe behavioural difficulty on the day of testing.

Outcome Measures

Indian Scale for Assessment of Autism (ISAA): The ISAA was used as the measure of autism severity. The scale assesses autism-related characteristics across domains including social relationship, emotional responsiveness, speech-language communication, behaviour patterns, sensory aspects and cognitive components. The resulting score was used as the quantitative measure of autism severity for correlation analysis.

Timed Up and Go (TUG): The TUG was used as the measure of functional mobility. The test involves rising from a chair, walking three metres, turning, walking back and sitting down. The time required to complete the task was recorded in seconds. A longer completion time represented slower performance on the functional mobility task.

Ethical Considerations

Institutional approval was obtained from the Ethics Committee of TMV's Lokmanya Tilak College of Physiotherapy, Kharghar before commencement of the study. Parents/caregivers were provided with information regarding the study and written informed consent was obtained. Participation was voluntary and confidentiality of participant information was maintained.

Procedure

Potential participants were screened according to the inclusion and exclusion criteria. Following confirmation of eligibility and receipt of written informed consent, the participants underwent assessment using the ISAA and TUG. The assessments were performed according to the prescribed procedures for the respective measures. The collected observations were recorded for analysis. Data were subsequently entered into Microsoft Excel and checked for accuracy before statistical analysis.

Statistical Analysis

Descriptive statistics were used to summarize participant characteristics and the study variables. Normality of the variables was assessed using the Shapiro–Wilk test. The ISAA scores demonstrated a statistically significant departure from normality ($p = 0.030$), whereas the TUG scores did not demonstrate statistically significant evidence of non-normality ($p = 0.275$). Because the primary relationship involved a non-normally distributed variable, Spearman's rank correlation coefficient was selected to determine the correlation between ISAA score and TUG completion time. Statistical significance was interpreted using the reported p -value.

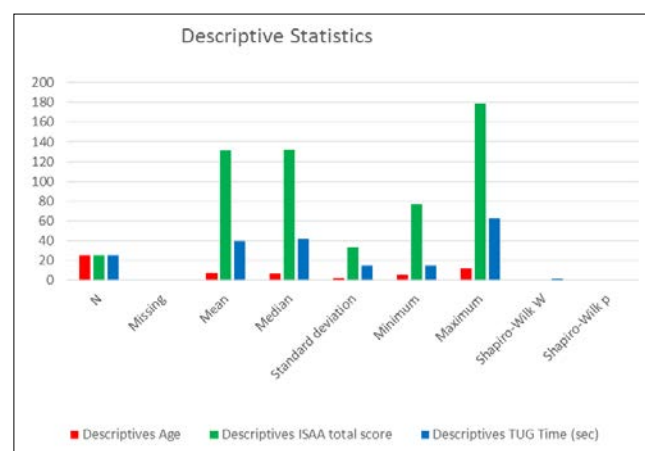
Results

Participant Characteristics

A total of 25 children with ASD were included in the final analysis. The mean age of the participants was 7.48 ± 2.24 years, with an age range of 5–12 years. The mean ISAA score was 131.00 ± 33.00 , with scores ranging from 77 to 179. The mean TUG completion time was 39.30 ± 14.90 seconds, with values ranging from 15 to 63 seconds.

Table 1: Descriptive Statistics of Age, ISAA Total Score and TUG Time

Variable	Frequency / Value
Total participants	80
Mean age $\pm$ SD	5.78 ± 1.48 years
Minimum age	3.2 years
Maximum age	8.0 years



Normality Testing

The Shapiro–Wilk test was used to assess the distribution of the study variables. ISAA scores were not normally distributed ($p = 0.030$). TUG completion time demonstrated $p = 0.275$, indicating no statistically significant evidence of non-normality. Based on these findings, Spearman's rank correlation was used for the primary correlation analysis.

Table 2: Shapiro Wilk Test for Normality

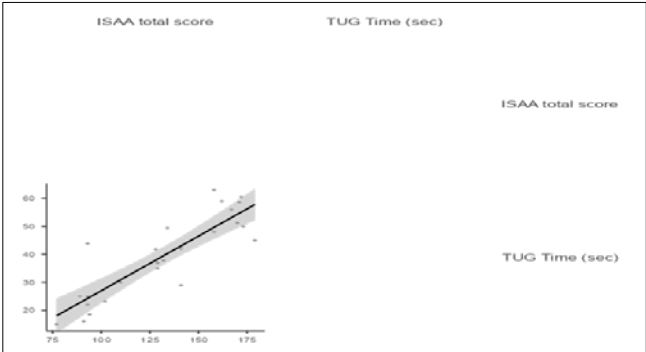
Variable	Shapiro–Wilk W	p-value	Interpretation
Age	0.879	0.007	Non-normally distributed
ISAA Total Score	0.909	0.030	Non-normally distributed
TUG Time (seconds)	0.952	0.275	Normally distributed

Correlation between Autism Severity and Functional Mobility

The analysis demonstrated a strong positive correlation between ISAA score and TUG completion time (Spearman’s $\rho = 0.839$, $p < 0.001$). Thus, higher ISAA scores were associated with longer times required to complete the TUG test. In functional terms, participants with higher autism severity scores tended to demonstrate slower performance on the TUG task.

Table 3: Correlation between Autism Severity and Functional Mobility

Variables	Spearman's rho (ρ)	df	p-value
ISAA Total Score and TUG Time	0.839	23	< 0.001



Correlation graph between ISAA and TUG

Discussion

The present study aimed to determine the correlation between autism severity and functional mobility in children with Autism Spectrum Disorder (ASD). The findings revealed a strong positive correlation between ISAA scores and TUG completion time, indicating that higher autism severity scores were associated with longer TUG times and poorer functional mobility.

The TUG test involves moving around, requiring balance, postural control, coordination and motor planning. Difficulties in these areas may affect the efficiency of functional movements in children with ASD. The findings suggest that children with higher autism severity scores may experience greater challenges in performing such mobility tasks. These results are consistent with Martin-Diaz et al, who reported differences in motor skills between children with ASD and typically developing children. Their findings highlight the importance of assessing motor abilities.

The use of the Indian Scale for Assessment of Autism (ISAA) provided a standardized measure of autism severity. Previous study reported associations between ISAA scores and established measures of autism severity, supporting its clinical use in the Indian population.

From a physiotherapy perspective, these findings show the importance of assessing functional mobility in children with ASD. Identifying difficulties in their balance, coordination, functional movement may help physiotherapists plan individualized interventions to support independence and participation in daily activities.

Limitations

- The study had a relatively small sample size of 25 participants, which may limit the generalizability of the findings.

- Convenience sampling was used, which may have introduced sampling bias and may not adequately represent the wider population of children with ASD.
- The study included only children who were able to walk independently and follow simple instructions, which may limit the applicability of the findings to children with greater functional limitations.

Future Scope

- Functional mobility was assessed using a single performance-based measure, the TUG test, and therefore other aspects of motor performance such as detailed gait characteristics, coordination and postural control were not separately evaluated.
- More representative or probability-based sampling methods may be considered in future research to reduce sampling bias.
- Longitudinal studies can be conducted to determine how changes in autism-related characteristics and motor abilities influence functional mobility over time.
- Future research can include additional measures of balance, coordination, gait, postural control, motor planning and functional independence to provide a more comprehensive understanding of mobility difficulties.

Conclusion

The present study investigated the correlation between autism severity and functional mobility in children with Autism Spectrum Disorder. Children with higher autism severity tended to require more time to complete the TUG test, indicating poorer functional mobility. The findings suggest that greater autism severity is associated with increased difficulties in functional mobility. The study highlights the importance of assessing motor and functional abilities along with the core characteristics of ASD.

References

1. Martín-Díaz P, Cuesta-Gómez A, Fernández-González P, Carratlá-Tejada M. Balance and motor skills differences between children and teenagers with autism spectrum disorder and neurotypically developing. *Autism research*,2024;17(8):1545-55.
2. Martín-Díaz P, Carratalá-Tejada M, Molina-Rueda F, Cuesta-Gómez A. Reliability and agreement of the timed up and go test in children and teenagers with autism spectrum disorder. *European Journal of Pediatrics*,2023;182(8):3577-85.
3. Chakraborty S, Thomas P, Bhatia T, Nimgaonkar VL, Deshpande SN. Assessment of severity of autism using the Indian scale for assessment of autism. *Indian journal of psychological medicine*,2015;37(2):169-74.
4. Mukherjee SB, Malhotra MK, Aneja S, Chakraborty S, Deshpande S. Diagnostic accuracy of Indian Scale for Assessment of Autism (ISAA) in children aged 2–9 years. *Indian pediatrics*,2015;52(3):212-6.
5. Chauhan A, Sahu JK, Jaiswal N, Kumar K, Agarwal A, Kaur J, et al. Prevalence of autism spectrum disorder in Indian children: A systematic review and meta-analysis. *Neurology India*,2019;67(1):100-4.
6. Tajane S, Bhattad R, Paliwal C, Patva J, Shyam AK, Sancheti PK. Timed Up and Go (TUG) Manual Test: Normative Data for School-Age Children (9–12 years). *Indian Journal of Pediatrics*,2025;92(4):425-.

7. Nicolini-Panisson RD, Donadio MV. Normative values for the Timed 'Up and Go' test in children and adolescents and validation for individuals with Down syndrome. *Developmental Medicine & Child Neurology*,2014;56(5):490-7.
8. Williams EN, Carroll SG, Reddihough DS, Phillips BA, Galea MP. Investigation of the timed 'up & go' test in children. *Developmental medicine and child neurology*,2005;47(8):518-24.
9. Patra S, Arun P. Use of Indian scale for assessment of autism in child guidance clinic: an experience. *Indian journal of psychological medicine*,2011;33(2):217-9.
10. Smith J, DiVito M, Fergus A. Reliability and discriminant validity of the quantitative timed up and go in typically developing children and children with cerebral palsy GMFCS levels I-II. *J Pediatr Rehabil Med*,2023;16(1):25-35. doi: 10.3233/PRM-210034. PMID: 36031915.
11. Abdul Rahman RA, Rafi F, Hanapia FA, Nikmat AW, Ismail NA, Manaf H. Effect of Dual-Task Conditions on Gait Performance during Timed Up and Go Test in Children with Traumatic Brain Injury. *Rehabil Res Pract*,2018;2018:2071726. doi: 10.1155/2018/2071726. PMID: 30402290; PMCID: PMC6193351.
12. Panchal A, Tedla JS, Ghatamaneni D, Reddy RS, Sangadala DR, Alshahrani MS. Normative reference values for the timed up-and-go test in Indian children aged four to 11 years old and their correlation with demographic characteristics: A cross-sectional study. *Niger J Clin Pract*,2021;24(4):569-575. doi: 10.4103/njcp.njcp_204_20. PMID: 33851680.